

In re Patent Application of:
SMITH
Serial No. **09/441,709**
Filed: **November 16, 1999**

REMARKS

Applicant would like to thank the Examiner for the thorough examination of the present application. Applicant would also like to thank the Examiner for correctly indicating as allowable the subject matter of dependent Claim 84.

Claims 33-50 are being cancelled to advance prosecution of the present case. As requested by the Examiner, an abstract is enclosed herewith in which the line spacing is double spaced. Noted grammatical errors have been corrected in Claims 65 and 81. The arguments supporting patentability of the claims are presented in detail below.

I. Independent Claim 65 Is Patentable

Independent Claim 65 has been rejected over the Maruo patent in view of the Loughheed patent and in further view of the Ninomiya et al. patent. Independent Claim 65 is directed to a method for processing a video data stream in an electronic imaging system comprising a memory, and the video data stream comprises a series of pixel values corresponding to pixel sites in the electronic imaging system.

The method comprises filtering the video data stream in real time for correcting/modifying defective pixel values. The filtering comprises filtering pixel values not stored in the memory using a first filtering algorithm, identifying defective pixel values, storing locations of the defective pixel values in the memory, and filtering the defective pixel values stored in the memory using a second filtering algorithm.

Referring now to Maruo, a method of image processing is disclosed. In particular, Maruo discloses in column 2,

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lines 40-44 a first filtering algorithm for filtering pixel values of a video data stream for identifying defective pixel values. The Examiner has characterized the image processing operation as disclosed in column 2, lines 60-65 as a second algorithm for removing the defective pixels.

As correctly noted by the Examiner, the second algorithm does not involve filtering. The Examiner cited the Lougheed patent as disclosing this feature of the claimed invention. In addition, the Examiner correctly notes that Maruo and Lougheed both fail to disclose that the locations of the defective pixel values are stored in a memory before being filtered with the second algorithm. The Examiner cited the Ninomiya et al. patent as disclosing a memory (defect memory circuit **25**) for storing the locations of the defective pixel values.

The Examiner has taken the position that it would have been obvious to combine the first filtering algorithm as taught by Maruo with the second filtering algorithm as taught by Lougheed, and with the defect memory circuit as taught by Ninomiya et al. so that the locations of the defective pixels are stored in the memory prior to being filtered by the second filtering algorithm.

The Applicant respectfully disagrees and asserts that there is no proper motivation to modify Maruo in view of Lougheed and in further view of Ninomiya et al. in the manner set forth by the Examiner. Absent the Applicant's disclosure, one of ordinary skill in the art would not look to store the locations of the defective pixels (Maruo) in a memory (Ninomiya et al.), and then use a second filtering algorithm for filtering the defective pixel values (Lougheed).

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In fact, the Applicants submit that modifying the Maruo patent in the manner set forth by the Examiner requires extra steps that are not taught or suggested by Maruo. For instance, in column 2, lines 40-50, Maruo discloses that the original image of an object being examined is represented by "A", and a filtered image from which noise components occurring as points are removed is represented by "B". A difference image "C" between the filtered image "B" and the original image "A" is formed, thus providing an image for individual points comprising only noise components. A binarization of the difference image "C" provides a binary image "D". An image processing operation is applied to image "D" to remove the pixel in question that represents a noise or point defect, wherein the pixel in question has a value of 1 and is surrounded by eight adjacent pixels having a value of 0. The Applicant submits that Maruo fails to teach or suggest that images "B" or "C" are stored in a memory prior to applying the image processing operations for filtering the defective pixel values from image "D". If images "B" or "C" were to be stored in memory, and if the image processing operations were to include a filtering algorithm, then further modification beyond what is disclosed in the prior art references would be required to produce the claimed invention.

Applicant thus asserts that only in hindsight, and having the benefit of the Applicant's disclosure, would the skilled artisan possibly be motivated to modify Maruo in view of Loughheed and in further view of Ninomiya et al. Therefore, the Applicant submits that independent Claim 65 is patentable over the Maruo patent in view of the Loughheed patent and in further view of the Ninomiya et al. patent.

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II. Independent Claim 82 Is Patentable

Independent Claim 82 has been rejected over the Maruo patent in view of the Loughheed patent. Independent Claim 82 is directed to an apparatus for processing a video data stream comprising an electronic imaging device, and a first filter circuit connected to the electronic imaging device for filtering the video data stream in real time for correcting/modifying defective pixel values. The video data stream comprises a series of pixel values corresponding to pixel sites in the electronic imaging device.

A sampling circuit is connected to the first filter circuit for sampling the video data stream to obtain a data set comprising a current pixel value and a plurality of adjacent pixel values. A ranking circuit is connected to the sampling circuit for sorting the plurality of adjacent pixel values into a rank order based upon predetermined criteria. A comparator is connected to the ranking circuit for comparing a current pixel value with the plurality of adjacent pixel values of selected ranks, and for generating a first filter output based upon the comparison. A median circuit is connected to the ranking circuit for determining a median value of the plurality of adjacent pixel values and for generating a second filter output equal to the median value.

Referring again to Maruo, the Examiner has taken the position that a device for processing a video data stream is disclosed, wherein a CCD is the imaging device. The Examiner characterized the median filter as the first filtering circuit, and has taken the position that the sampling circuit is inherently taught.

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As correctly noted by the Examiner, Maruo fails to disclose a ranking circuit and a comparator for generating a first filtered output. The Examiner cited Loughheed as disclosing a ranking circuit (rank sorter **38**) and a comparator (output selector **36**). The Examiner has taken the position that it would have been obvious to incorporate the ranking circuit and comparator as taught by Loughheed into the defective image detecting device as taught by Maruo.

The Applicant respectfully submits that even if the references were combined as suggested by the Examiner, the claimed invention is still not produced. In particular, Maruo and Loughheed both fail to disclose a median circuit connected to the ranking circuit for determining a median value of the plurality of adjacent pixel values, and for generating a second filter output equal to the median value. Maruo discloses that a median filtering operation is performed on the original image "A" of the object being examined to provide a filtered image "B" from which noise components occurring as points are removed, as discussed above. However, the median filtering operation in Mauro is not connected to a ranking circuit for generating the second filter output equal to the median value, as recited in independent Claim 82.

Accordingly, it is submitted that independent Claim 82 is patentable over Maruo in view of Loughheed. In view of the patentability of independent Claims 65 and 82, it is submitted that the dependent claims which recite yet further distinguishing features of the invention are also patentable. These dependent claims need no further discussion herein.

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CONCLUSION

In view of the arguments provided herein, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,



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